Site ID: 0714BE01

Mr. Paul V. Rosasco
Project Coordinator
Engineering Management Support, Inc.
7220 West Jefferson Avenue, Suite 406
Lakewood, Colorado 80235

Dear Mr. Rosasco:

The U.S. Environmental Protection Agency (EPA) is providing comments for the reviewed document submittal titled "Bridgeton Landfill Thermal Isolation Barrier Investigation Phase 1 Report, Bridgeton, St. Louis County, Missouri" prepared by Feezor Engineering, Inc. and P. J. Carey & Associates, in conjunction with Engineering Management Support, Inc. and Auxier and Associates, Inc. The cover letter on the document was dated December 19, 2014 and submitted to EPA in accordance with the Administrative Order on Consent, EPA Docket No. VII-93-F-0005, paragraph 51 to complete characterization of radiologically impacted material (RIM) at OU1, Area 1.

Majority of the general comments enclosed were previously discussed at our joint technical meeting held on January 23, 2015 and agreed upon by the responsible parties in their response letter to the EPA, dated January 27, 2015. Other additional comments are also provided, which are either general in context or document specific per the EPA's complete review of the December draft report. All comments should be directly addressed through written correspondence to the EPA and can be discussed by teleconference or email if needed to expedite response. Once approved, the Agency will request a revised work plan submittal for review and approval. If the comments submitted by the EPA today cannot be timely addressed before the next iteration of the draft work plan is submitted for Agency review (i.e., they cross paths), it is understood that they will be addressed, and where applicable, incorporated prior to submission of a revised final work plan. The EPA also reserves the right to submit further comments on the pending iteration of draft work plan submittal.

Based on our February 18 and March 2, 2015 follow up teleconferences and as discussed above, comments that are relevant to the next phase of soil characterization and fieldwork activities should be incorporated into the revised work plan. Once the EPA approves the revised document, the responsible parties will proceed in accordance with the work plan schedule to complete this additional work. At the completion of fieldwork activities this summer, any enclosed EPA comments related to reporting data results should be incorporated within a comprehensive report that contains data from every phase of RIM characterization fieldwork performed to date and following the conclusion of the final phase this year.

If you have any questions regarding this document, EPA's comments or would like to discuss other issues, please email or contact me at (913) 551-7611.

Sincerely,

Brad Vann
Remedial Project Manager
Missouri/Kansas Remedial Branch
Superfund Division

Encl:

cc: Shawn Muenks, MDNR
Robyn Kiefer, USACE

General Comments:

1. All field notes and photos should be attached to the comprehensive report or added as appendices.

2. The Data Quality Objectives in the pending revised work plan must differentiate the radiological contaminants from a radioactively impacted material (RIM) source versus a non-RIM/naturally occurring or other sources. Please revise the DQOs accordingly.

3. The upcoming investigation is dependent on the historical photographs to determine sampling locations. It is EPA understanding from our last teleconference that an aerial survey of the landfill was taken in 1973 and available, and was verbally requested during our last telephone conference. Therefore, please provide copies of this photograph and/or stereographic pairs, along with any other relevant or referenced historical information to EPA for supporting the rationale behind sample locations and or historical placement of RIM. This may be provided with the revised work plan or as a separate submittal to EPA.

4. The comprehensive final report must include a conclusion and recommendations section. In addition, document figures warrant revision that accurately depict and incorporate relevant site information both historical and based on recent sampling results around OU1, Area 1, as some of the historical RI boundaries are now obsolete.

5. Supplemental sampling needs to identify a clear process in the work plan, or reference an existing one, for decision making while in the field and further investigation if concentrations of RIM are found in the pending expanded investigation locations without requiring another mobilization.

6. All work related documents (e.g., work plans, reports, deliverables, etc.) from this point forward must include a schedule of primary tasks/activities/milestones with along projected dates for their start/completion and where applicable identification of any critical path items.

7. It is EPA's intention to collect split samples during the next round of fieldwork for submission of TCLP standard and/or pyrolysis analysis. Soils identified as containing RIM associated with the radionuclides historically dispose of at OU1 Area 1, need to be made available to EPA personnel or their field representatives. This would include and is not limited to existing RIM soils samples collected during the prior round of characterization that are currently maintained onsite.

8. Per the technical conference with EPA personnel on January 23, 2015 and consistent with the January 15, 2015 letter sent by EPA, RPs need to perform additional bounding sampling near elevated locations to determine whether or not contamination extends outside these areas. This includes establishing a no RIM boundary and performing additional sampling southward towards the North Quarry area and west of the original boundary of Area 1 to determine the extent of RIM in this area. Ideally samples could be placed per that discussion to ensure best coverage, support the existing data, and in

accordance with risk-based statistic, given the heterogeneity of how RIM was placed in the landfill. As previously discussed, there's a lot of value in using historic imagery to try to identify areas of potential concern. Where historic imagery is utilized it must be cited to help support sampling locations, and where available copies provided in reports to justify sampling locations (see General Comment 3).

9. For reporting purposes and work after the investigation, EPA recommends the RPs revisit some assumptions of the Baseline Risk Assessment using this new data and any future collected data as part of the RIM characterization to ensure site conditions are still similar to what has been previously assessed. It's possible to calculate the total amount of Thorium-230 disposed of in 8,700 tons of waste material, this value is ~1.5E15 pCi.

   Using the UCL95 values provided in the BLRA you arrive at a total accounted for activity of 1.3E15, or about 90% of the material is accounted for, which is probably a pretty good estimate.

   Conversely, if the average value is used, you arrive at an accounted for activity of only 7.5E14, which is roughly 50% of the material...

   With this new data the material present appears to be in a larger area, at least at Area 1, and present in thicker layers, and/or is present at higher activities than what was assumed in the BLRA. Therefore, this information will need to be reevaluated in the revised BRA prior to amending the Supplemental Feasibility Study.

Specific Comments:

1. Section 1, pg. 7, Paragraph: Report states, "Although these criteria identify levels that would allow for unrestricted use of the site, these criteria have no relationship to risk-based criteria for a solid waste landfill or levels that would be protective if an SSE were to occur in these materials." The final report needs to state that risk-based criteria for this site has not been determined, therefore, comparison to unrestricted use criteria is being used.

2. Section 1.1.2.2, Page 8, Paragraph 4: Report states that monthly groundwater levels measured in 2000 and 2005 indicated that groundwater generally occurs only in the underlying alluvium at or below the base of the landfill material. As such, recent groundwater levels need to be reviewed and also cited in the final report to indicate whether current data shows the groundwater level is still at or below the depth of waste; or could reference section 7.2 to indicate that 2013 investigation results confirm that current conditions still indicate fluid levels at or below the base of the landfill material, which is consistent with the 2000 and 2005 groundwater levels.

3. Section 1.1.3, Page 9: This paragraph references the proposed thermal isolation barrier location. Two alignment alternatives have been proposed. The final report will need to include a figure or figures to indicate which IB location is being referred.

4. Section 1.1.3.2, Page 9, Paragraph 2: Report states laboratory analysis of surface soil samples (the upper 6 inches) detected radionuclides at levels above 5 pCi/g above background at boring locations WL-106 and WL-114. Figure 2 only shows WL-106B. In the final report, please clarify if this is the same well as WL-106 or not and correct if needed.

5. Section 3.2.5, Page 17, Paragraph 2: In this paragraph, and at several other locations in the document, it is stated that a screening value of 200-250 cps was used to identify potentially elevated gamma readings. Be sure to include an explanation on how that screening level was determined in the final report.

6. Section 4.2.1, Page 24, Paragraph 2: Last sentence states, "Samples were then geologically logged, photographed, scanned for radiation, and samples for radiological analyses were selected." Expand this section in the final report to indicate how the samples for radiological analyses were selected and how the number of samples selected were determined or reference section 4.4 where further discussion is provided.

7. Section 4.2.2, Page 25: Section identifies sonic borehole locations selected if GCPT data indicated the potential for RIM (1-2, 2-2, 5-3, 1C-6). Also states 8-1 and WL-119 were selected to further understand slightly elevated GCPT sounding results. Clarify whether the "if" needs to be changed to "because", as "if" implies the borings were pre-selected, then amend the text in the final report accordingly. Also, there is no mention of why sonic boreholes 12-5, 13-3, 13-6, 14-2, 14-4, 14-5, 14-7, 15-2 (& 2A), 16-3, and 16-6 were drilled, which warrants addressing in the final report.

8. Section 4.4, Page 27, Paragraph 1: States "Intervals with elevated gamma readings were selected for offsite laboratory analysis." Additional text is needed in the final report to clarify what constitutes an "elevated gamma reading". Also, clarify if the samples taken from the interval were from locations that exhibited the highest 2 gamma reading in each interval. Additional text also needs to discuss if samples taken where there were no elevated gamma readings, and if an attempt was made to collect samples above and below the elevated readings to identify if the vertical extent of RIM had been identified at those locations.

9. Section 5.3.5, Page 32: This section does not provide narrative summary of results of four gas monitoring as the other sections do. A results summary statement needs to be included in this section within the final report, and backup data provided and referenced in an appendix.

10. Section 5.3.8.1, Page 33: A statement must be included in the final report how alpha readings above 20 dpm/100cm2 and beta-gamma readings above 1000 dpm/100 cm2 were determined to be contaminated. This comment also applies to sections 5.3.8.2 and 5.3.8.3, which use this same reference level.

11. Section 6, Page 34, Paragraph 1: States " …based upon review of historic images, it was determined during the investigation that a deeper quarry existed in the southeast portion of OU1 Area 1 that could be problematic to the barrier design." The final report must

clarify where you are referring to Bridgeton Sanitary LF North Quarry, and if so, should also state that it doesn't appear to be some newly identified feature.

12. Appendix C3 & Figure 6: Sonic downhole borehole log and core scan shows columns for samples collected and shipped. Figure 6, sonic boring 1-2 shows a sample was collected at depths of 8-9', 18-19', 20-21', 22-23', 24-25', 28-29', 33-34', 38-39', 39-40', and 40-41' and results were provided. However, the sample shipped box on the log was only checked for samples 28-29' and 39-40'. This discrepancy warrants documenting in the final report and demonstrates the absolute need for boring logs to be rechecked, especially in the field, for accuracy to ensure they are complete and correctly reported.

13. Figures General Comment 1: The final report needs to include another set of figures that contain all results, including past sample results and recent sample for each radionuclide to facilitate a better understanding of RIM distribution in Area 1. Historically interpolated boundaries also merit updating from these additional figures as they have been disproven.

14. Figures General Comment 2: If the data is available, it needs to plot the results of samples below the depth of contamination, or the CPT gamma results plotted for the interval below the highest results. For example, it's helpful at location Sonic 1-2 to see that the interval immediately below the high sample was non-detect, whereas at Sonic 1C-6 it's not immediately clear if a "clean" sample was ever identified. It would also help to color code or otherwise identify borings where elevated material is found. While the posting plots are useful, it's hard to get a good visual summary of the data as presented, and needs to be revised accordingly in the final report.

15. Figure 2: Figure references "elevated" and "non-elevated" historical boundaries. All figures in the final report need to be changed to quantify the "elevated" levels, and areas of surface RIM be clearly identified.

16. Figure 14: The profile shows GCPT-12 hit alluvium at elevation 442. However, on the 1971 aerial it appears the elevation at this location is ~432 along the edge of what appears to be a lagoon and is where the 1C-12 is located. In a 1973 aerial it appears the lagoon is essentially filled in, which means it is possible that what is being classified as alluvium is actually spoils from the quarrying operation or some other type of fill. Review this information accordingly, clarify and if necessary revise in the final report.

17. Cross Sections: Revision showing the lab results for sonic borings in each cross section at each depth a sample was collected would significantly improve clarity and avoid possible reviewer error. Cross referencing between logs, downhole scans, and lab reports is confusing and time-consuming and can lead to error; thus, having as much of the pertinent data at one glance would aid in understanding the contaminant distribution. Please revise accordingly, in the final report.